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**Stone**

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(54) **SKYLIGHT WITH THERMAL BREAK**

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( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 124 days.

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(22) Filed: **Jan. 17, 2012**

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(51) **Int. Cl.**
***E04B 7/18*** (2006.01)

(52) **U.S. Cl.**
USPC ..... **52/200**; 52/204.5; 52/204.53; 52/204.72

(58) **Field of Classification Search**
USPC ..... 52/72, 200, 204.5, 204.53, 204.71, 52/204.72, 309.1, DIG. 17
See application file for complete search history.

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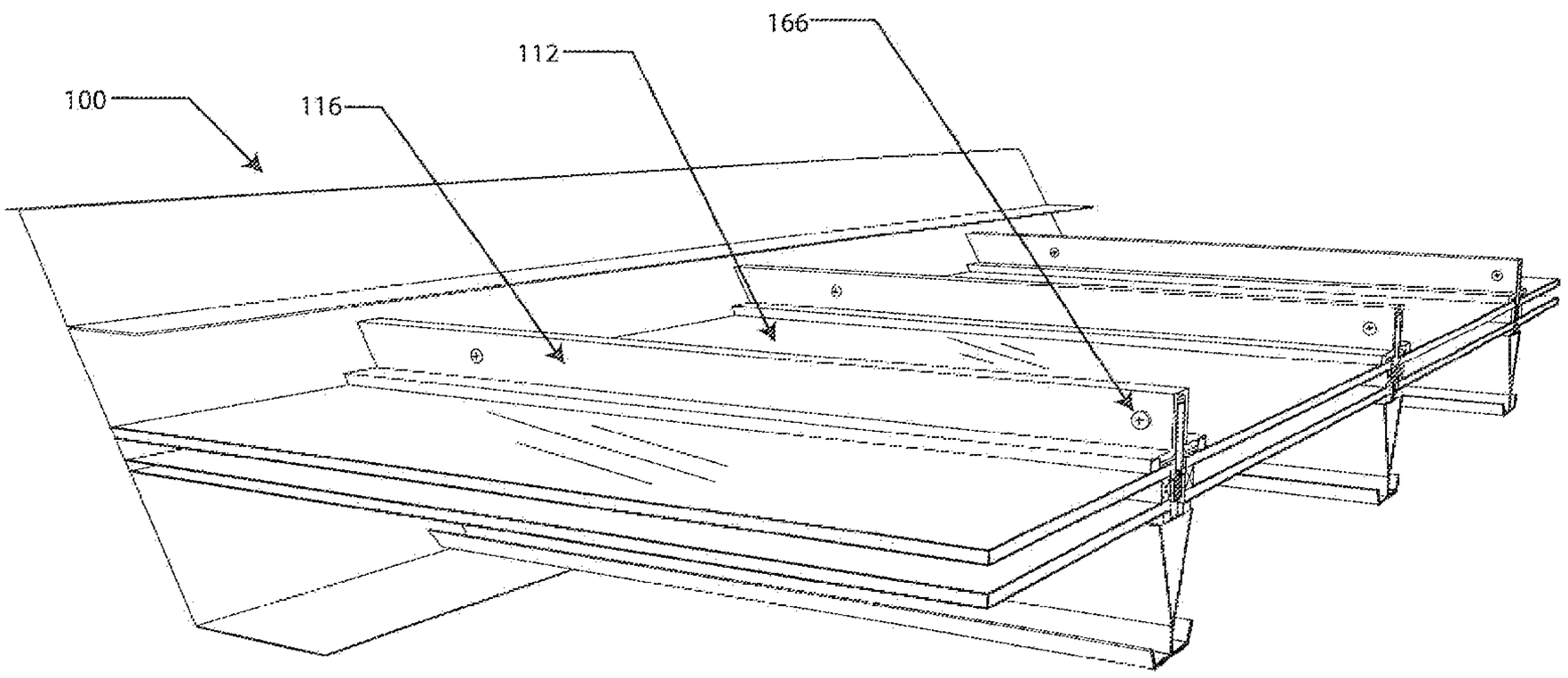
(57) **ABSTRACT**

A skylight includes at least one glass section supported by an intermediate member. The intermediate member includes a beam supporting the glass section, a cap disposed above the glass section and an insulator disposed between and attaching the beam to the cap. The insulator forms a thermal break to impede heat transfer through the skylight in either direction.

**14 Claims, 6 Drawing Sheets**



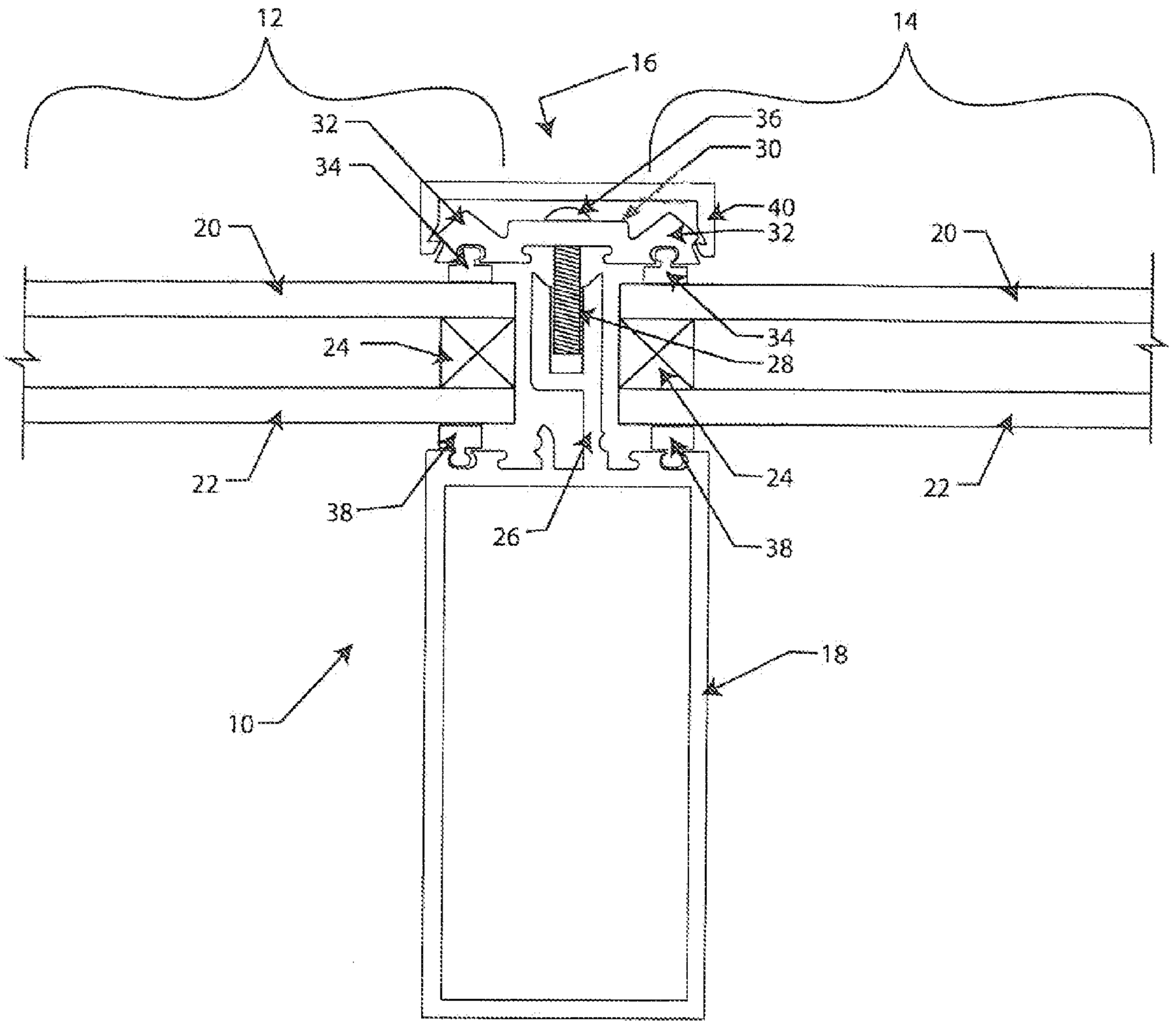



Fig. 1
PRIOR ART

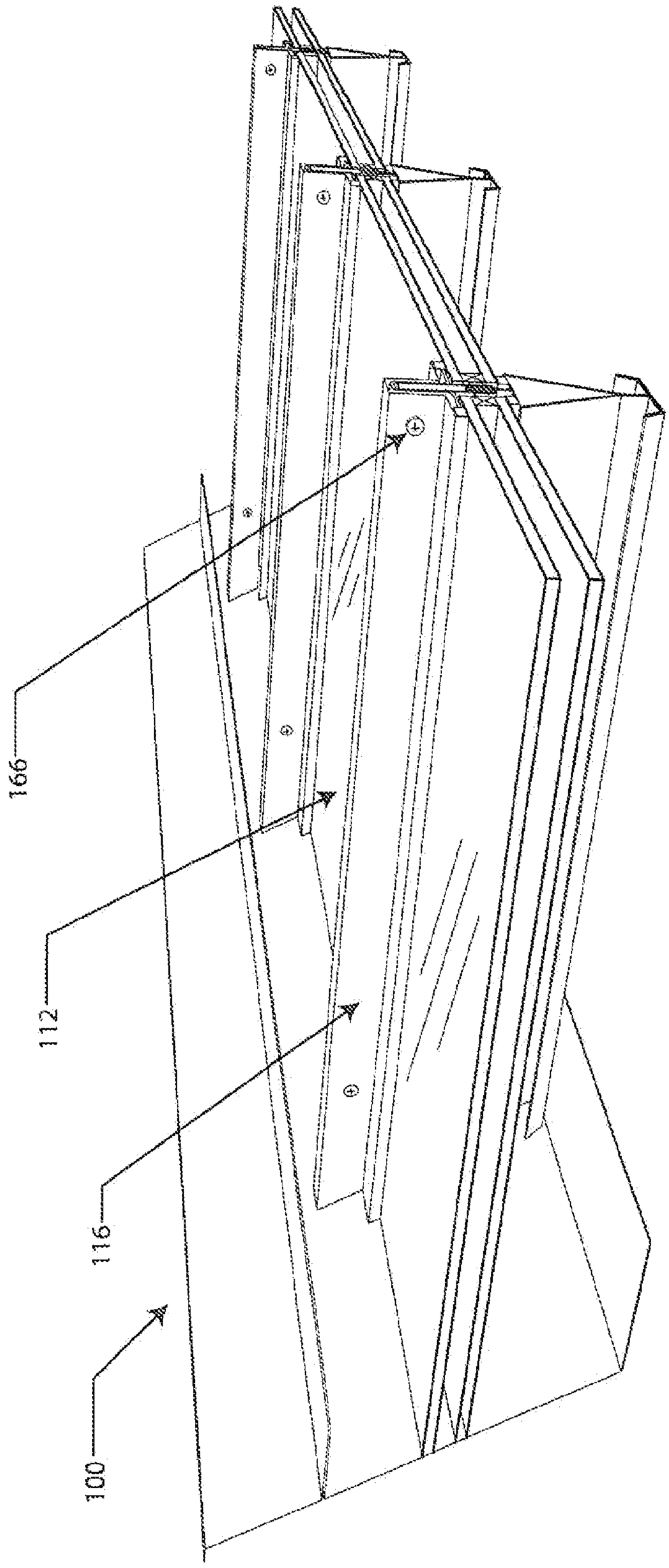



Fig. 2

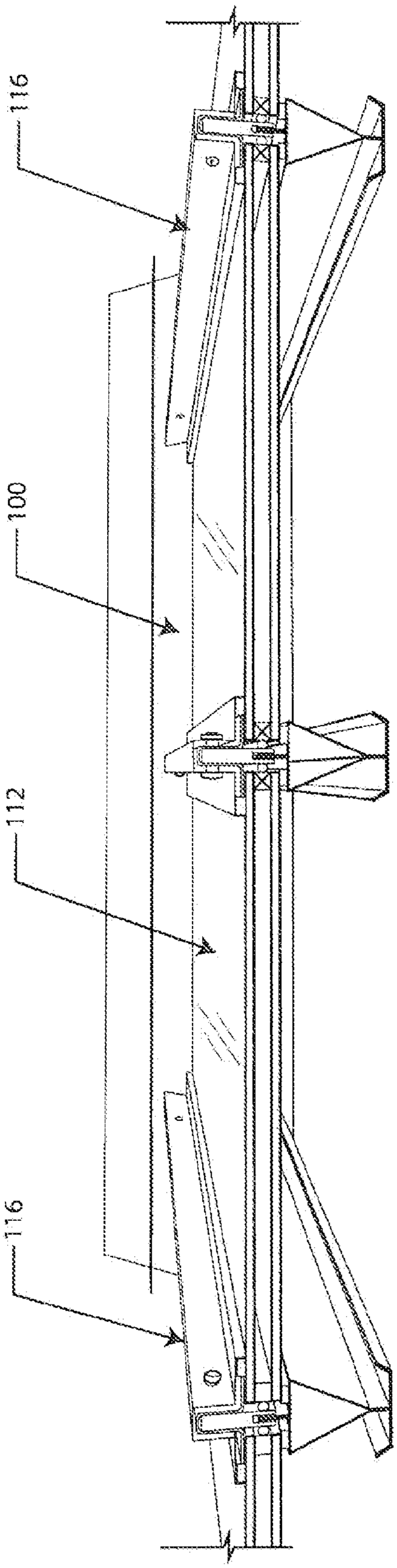
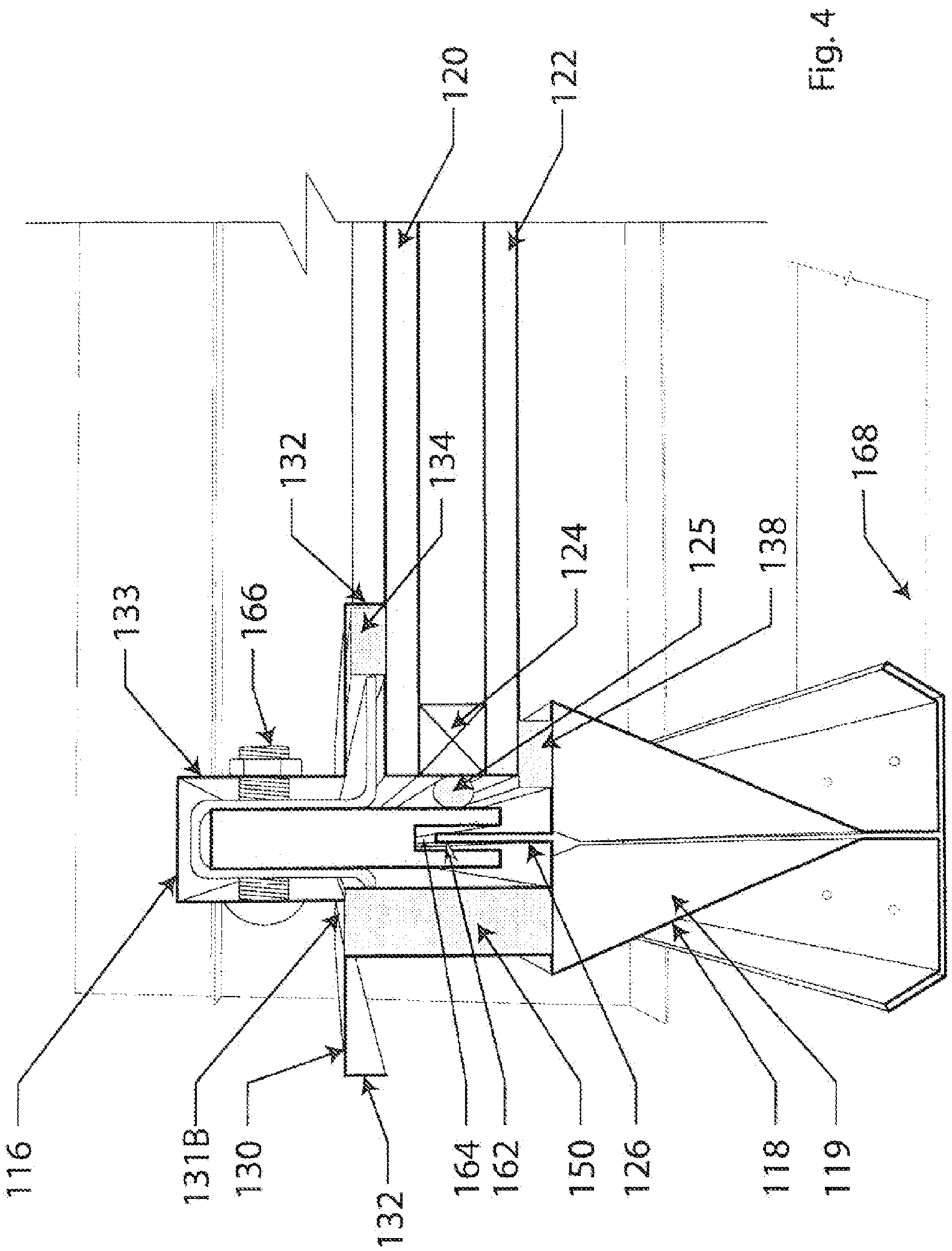



Fig 3.


120
122
132
134
168
133
166
124
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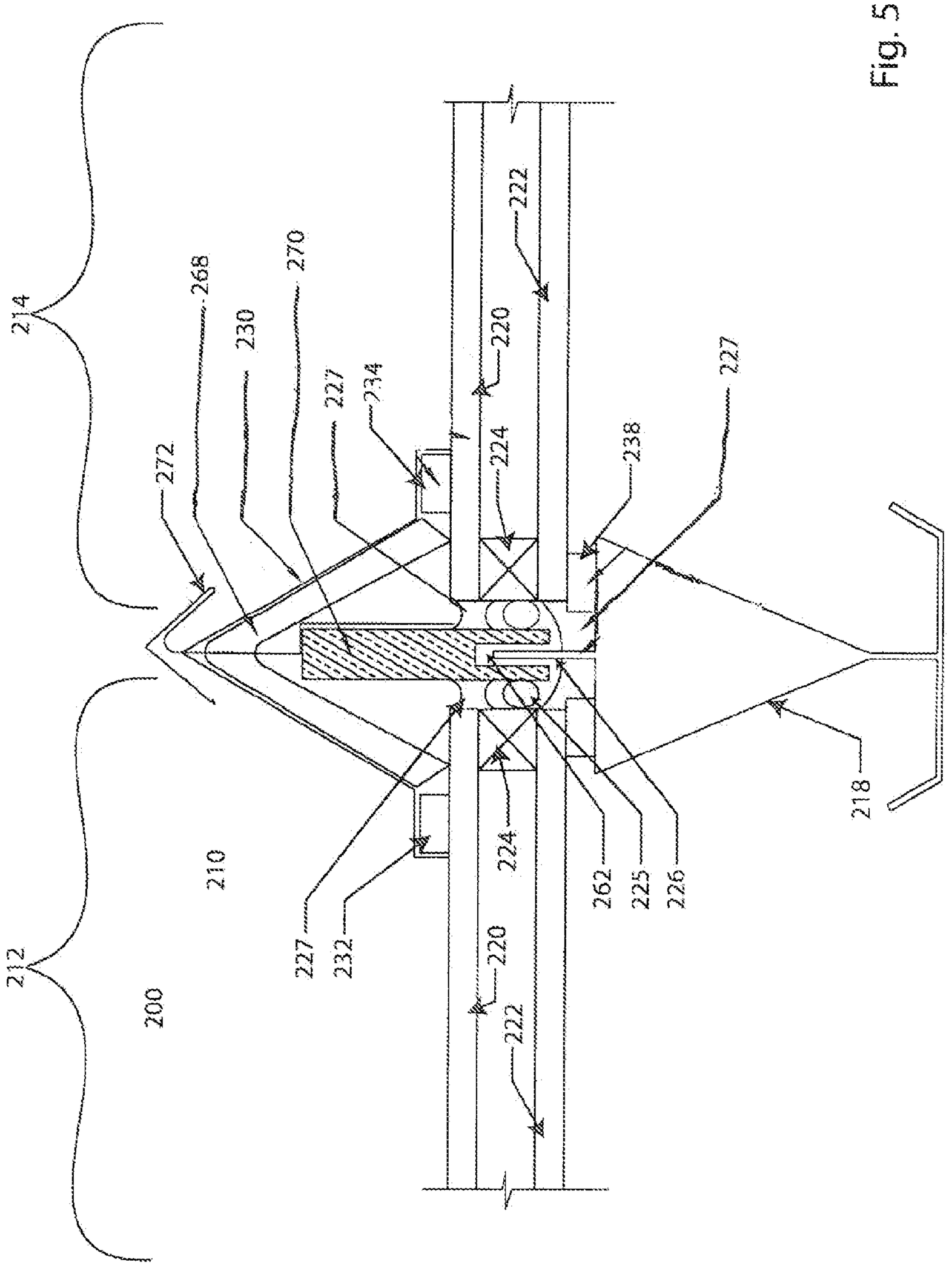
138
116
131B
130
132
164
162
150
126
118
119

Fig. 4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268
230
270
227
234
272
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220
224
238
227
210
218
262
225
226
212
200
227
232
220
222

Fig. 5

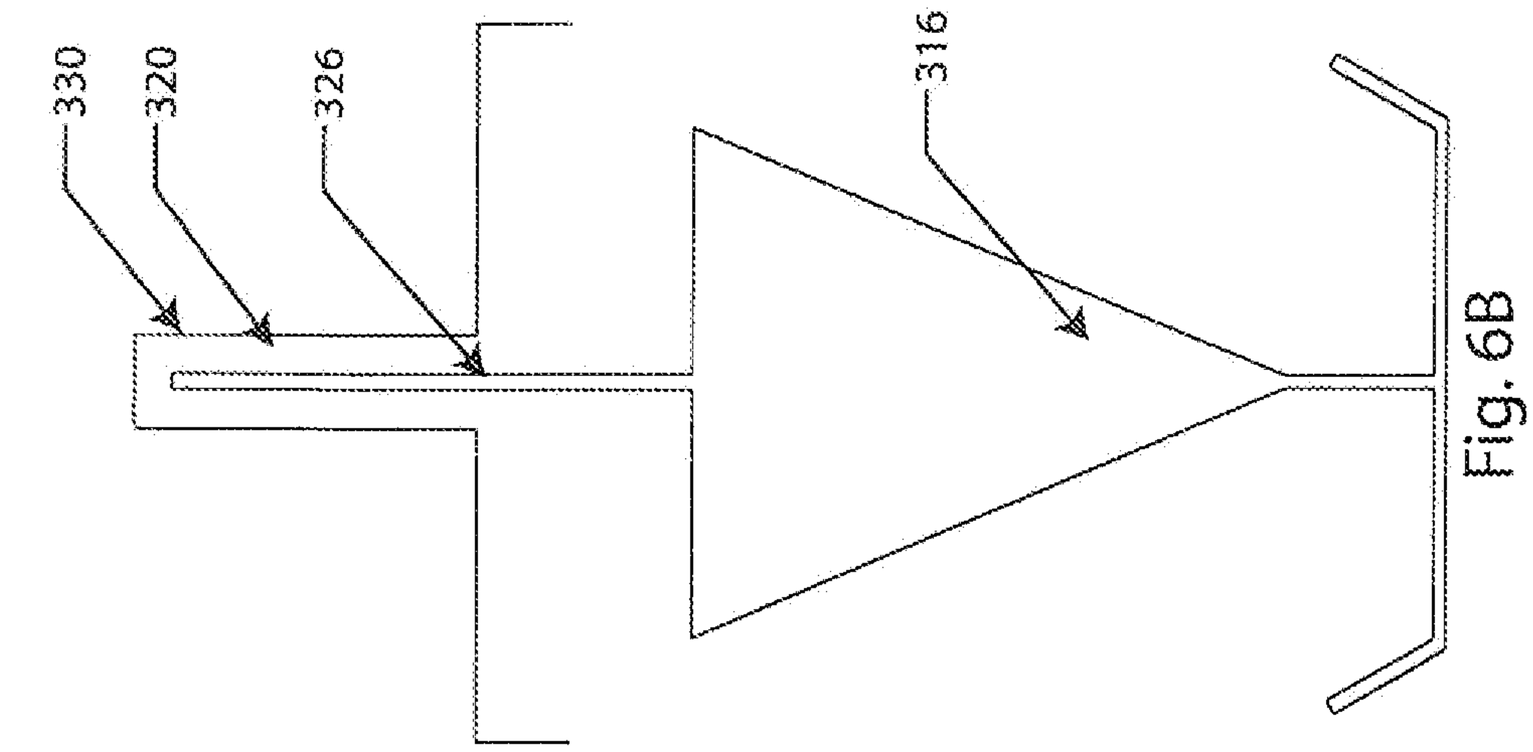


Fig. 6B

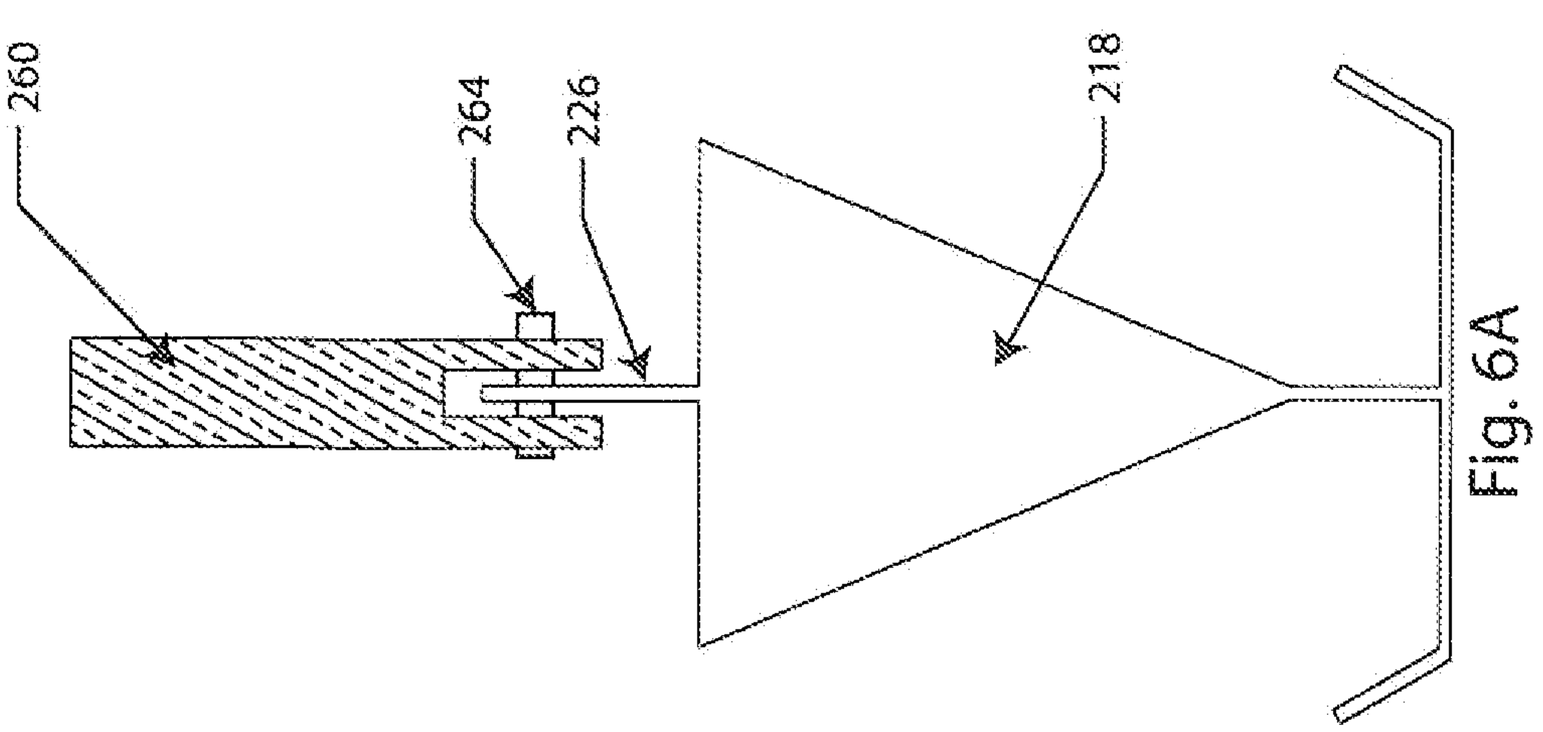


Fig. 6A

# SKYLIGHT WITH THERMAL BREAK

## RELATED APPLICATION

This application claims priority to U.S. Provisional Application Ser. No. 61/432,635 filed on Jan. 14, 2011 and incorporated herein in its entirety.

## BACKGROUND OF THE INVENTION

A. Field of Invention

This invention pertains to a skylight formed of one or more sheets of glass supported by a formed sheet metal frame and having a thermal break for insulation.

B. Description of the Prior Art

In recent years virtually all windows sold and installed in the US include a thermal break between the inner and outer components. The thermal break is formed using various well known insulating techniques. However, because of architectural and esthetic considerations, most skylights have different structures than windows, and these structures are normally not amenable to the same type of insulating techniques as the ones used for regular windows. This is commonly found, particularly with regard to the formed sheet metal skylights of the traditional style, often found on older and historic buildings.

It has been found that, because they are not properly thermally broken, skylights tend to conduct heat into a room during hot weather and have cold surfaces during cold weather. This latter problem is especially undesirable because it results in increased heating costs, and causes condensation that is esthetically unpleasing and may cause damage to the skylight and the surrounding area. Additionally, because many of the skylights of this fabrication style are found on older buildings, they are often fabricated of sheet copper, which is an excellent conductor of heat and energy, increasing the loss of valuable energy.

Thus, there is need for a skylight with a thermal break that is easy to install and inexpensive to build. Moreover, the skylight with a thermal break preferably has substantially the same dimensions so that it can be installed easily and efficiently without requiring special training. It is also critical that this skylight be capable of meeting the aesthetic concerns and needs of Historic and Landmarked buildings.

## SUMMARY OF THE INVENTION

A skylight constructed in accordance with this invention includes

at least one glass section having lateral edge, said glass section including at least one glass pane; and

an intermediate member disposed along the lateral edge, said intermediate member being constructed and arranged to support said glass section, said intermediate member including a beam extending along and under said respective edge, said beam being formed with a vertical rib extending upwardly and being laterally spaced from said edge, an insulator disposed on said beam and extending upwardly adjacent to said edge and being attached along a lower portion to said rib, and a cap disposed on top of said lateral edge and being attached to said insulator, whereby said insulator forms a thermal break for said skylight.

The cap has a dome-shaped or V-shaped portion extending upwardly with the insulator extending into this portion. The beam is attached to the insulator typically with rivets or screws, bolts, etc., and the cap is preferably attached to the insulator by screws, bolts, copper strap or etc. In one embodiment, further insulation is provided underneath the cap.



In another aspect of the invention, a skylight constructed in accordance with this invention includes a first glass section formed of at least two glass panes extending in parallel to each other, said glass section having an edge with a spacer disposed along said edge between said glass panes;

a beam arranged to support said first glass section, said beam including a a rib extending upwardly and laterally spaced from said edge;

a cap disposed above said beam and resting on said glass section; and

an insulator attached to said beam and said cap and providing thermal break therebetween.

The skylight may include a second glass section with said insulator being disposed between the glass sections. Alternatively, the skylight is provided with two or more glass sections, with respect intermediate members being provided between and at the ends of the glass sections.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a cross-sectional view of a first type of conventional skylight;

FIG. **2** shows an orthogonal view of a skylight constructed in accordance with this invention;

FIG. **3** shows a front cross-sectional view of the skylight of FIG. **2**;

FIG. **4** shows an enlarged front view of the skylight of FIG. **2**;

FIG. **5** shows a front cross-sectional view of an alternate embodiment;

FIG. **6**A shows an enlarged partial view of the embodiment of FIG. **5**; and

FIG. **6**B shows an enlarged view of a second conventional skylight.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows a conventional skylight **10** formed of two co-planar glass sections **12**, **14** disposed adjacent to each other with an intermediate member **16**. The intermediate member **16** is used to support the glass sections **12**, **14** on a beam **18**. Each glass section **12**, **14**, includes two glass panes (or glazing) **20**, **22**. At the edge of each section, the panes are separated by an insulating strip **24**.

The intermediate member **16** includes a vertical rib **26** extending along the whole edges of the glass sections **12**, **14**. Rib **26** is formed with a continuous ribbed groove **28** to receive screws.

On top of the rib **26** there is a flat horizontal cover **30** having lateral downwardly extending walls **32** resting on weather stripping **34**. The weather stripping **34** is resting on top of glass pane **20**. The cover **30** is attached to the rib **26** by metal screws **36** spaced at regular intervals and engaging the ribbed slot **28**. Weather stripping **38** is also provided between the glass panes **22** and the beam **18** as shown.

A protective cap **40** is disposed on top of cover **30**.

The beam **18**, rib **26**, screw **36**, cover **30** and cap **40** are all made of metal, e.g., aluminum or an alloy, and as a result, during warm weather heat is conducted from the outside to the inside through the elements just described. During winter, heat escapes through these same elements to the outside.

FIGS. **2-4** show a skylight constructed in accordance with this invention. In these figures, the skylight is depicted as having a single glass section (described more fully below)

supported at the two edges by respective intermediate members, it being understood that the skylight can have several glass sections.

More specifically, the skylight **100** includes a glass section **112** and intermediate sections **116**. The glass section is formed of two glass panes **120**,**122** separated by a spacer **124**. Weather strips **134**, **138** are provided above pane **120** and below pane **122**, respectively.

The intermediate member **116** includes a beam **118** with a rib **126** extending upwardly. In the Figures, the rib **126** is disposed between the glass section **112** and a spacer bar **150** made of wood or plastic. It should be understood that if the skylight has more than one glass sections, then the intermediate member **116** is disposed between two adjacent glass sections.

The beam **118** is preferably made of a flat sheet of metal, such as copper, galvanized steel, tin or alloys thereof. The sheet metal is then bent into the shape shown in the Figures so that it has a main, generally triangular section **119** with the rib **116** extending upwardly from the flat portion of section **119** and formed by overlapping portions of the sheet metal. The main section **119** can have other shapes as well.

Member **116** further includes a cap **130**. The cap **130** is formed with two wings **131**A, **131**B terminating in respective lateral walls **132** extending downwardly, with the weather stripping **134** being disposed between a portion of the cap **130** and the glass pane **120**. The cap **130** further includes a U-shaped portion **133** connecting the wings **131**A, **131**B. This U-shaped portion may also be sloped and resemble the top surfaces of a triangle.

A generally rectangular plastic insulator **160** is provided between the cap **130** and beam **118**. The insulator **160** is preferably made of a high impact plastic material so that it can withstand considerably compressive forces. The insulator is formed with a longitudinal groove **162** sized and shaped to receive the rib **126**. Insulator **160** has an upper portion that extends into the U-shaped or dome-shaped portion **133** of cap **130**.

Preferably, the insulator **160** is attached to the rib **126** by rivets, screws or bolts **164** equally spaced along the length of the insulator **162**.

Another set of screws or bolts **166** pass through the portion **133** of cap **130** and secure the cap **130** to the insulator **160**. The cap may alternatively be secured in place by way of a copper strap of approximately 1" in width, riveted to insulator **160** and extending through a slot in the cap. This strap is fed through a corresponding slot in the cap **130**, and bent down and sealed in place to secure the cap **130** in place.

To summarize, skylight **100** is formed of at least one glass section **112** and an intermediate member **116**. The intermediate member **116** supports the skylight **100**, for example on beam **168** and includes metallic members such as beam **118** and cap **130**. The insulator **160** separates these two members and provides a thermal break between the outside of a structure, usually above the skylight and the inside of the structure, usually below the skylight.

FIGS. **5** and **6** show an alternate embodiment. In this embodiment, skylight **200** is also formed of two glass sections **212**, **214** with an intermediate section **218**. The intermediate section **218** includes a beam **219** with a rib stem **226**.

The intermediate section **216** further includes an insulator **270** with a slot **262** receiving the rib stem **226**. In this embodiment, the insulator **270** (**260** in FIG. **6***a*) is attached to rib **226** by rivets **264**.

The cap **230** in this embodiment has a v-shaped center body **230** terminating with downwardly extending walls **232**. Under the center body, there is an inverted v-shaped secondary insulator **268** made of Styrofoam or similar material. Disposed along the edges of the glass panes there is at least on layer of sealant **227** to further provide insulation.

At several locations spaced longitudinally along cap **230**, there are several straps **272**. Has one end attached to the insulator **260** and a second end that passes through a respective hole in the cap (not shown) and is used to further maintain the cap **230** attached to the insulator **260** to retain cap and secondary insulation in place and provide initial water and UV barrier for sealants.

FIG. **6**B shows parts of another conventional skylight. This skylight also has a intermediate member **316** with a rib **326**. A V-shaped cap fits over the rib **326** and is attached to the rib directly using lateral screws, bolts, straps, or other well-known means. There is no insulation between the cap and the rib and therefore heat is transmitted through either in one direction or another.

Numerous modifications may be made to this invention without departing from its scope as defined in the appended claims.

I claim:

**1**. A skylight comprising:

at least one glass section having a lateral edge, said glass section including at least one glass pane; and

an intermediate member disposed along said lateral edge, said intermediate member being constructed and arranged to support said glass section, said intermediate member including a beam extending along and under said edge, said beam being formed with a vertical rib extending upwardly and being laterally spaced from said edge, an insulator disposed on said beam and extending upwardly adjacent to said edge and being attached along a lower portion to said rib, and a cap disposed on top of said lateral edge and being attached to said insulator, wherein said insulator includes a slot opening downwardly with said rib extending into said slot whereby said insulator forms a thermal break for said skylight.

**2**. The skylight of claim **1** further comprising first and second glass sections with said intermediate member is disposed between the lateral edges of the glass panes.

**3**. The skylight of claim **1** further comprising weather stripping between the glass pane and said beam.

**4**. The skylight of claim **1** wherein said cap includes a dome shaped portion with said insulator extending into said dome-shaped portion.

**5**. The skylight of claim **1** further comprising attaching elements attaching said rib to said insulator.

**6**. The skylight of claim **1** further comprising attaching elements attaching said cap to said insulator.

**7**. The skylight of claim **1** wherein said cap has a V-shaped portion with said insulator extending into said V-shaped portion.

**8**. The skylight of claim **1** wherein said intermediate section further includes at least one strap extending upwardly through said cap.

**9**. A skylight comprising:

a first glass section formed of at least two glass panes extending in parallel to each other, said glass section having an edge with a spacer disposed along said edge between said glass panes;

a beam arranged to support said first glass section, said beam including a rib extending upwardly and laterally spaced from said edge; a cap disposed above said beam and resting on said glass section, wherein said cap and beam are made of metal and an insulator attached to said beam and supporting said cap and providing thermal

break therebetween wherein said insulator includes a slot oriented downwardly and said rib extends into said slot.

**10**. The skylight of claim **9** further including a second glass section with said insulator being disposed between said glass sections.

**11**. The skylight of claim **9** further comprising attaching elements attaching said rib to said insulator.

**12**. The skylight of claim **9** further comprising attaching elements attaching said insulator to said cap.

**13**. The skylight of claim **9** further comprising insulating elements disposed between said cap and said glass section.

**14**. A skylight comprising:

at least one glass section having a lateral edge, said glass section including at least one glass pane; and

an intermediate member disposed along said lateral edge, said intermediate member being constructed and arranged to support said glass section said intermediate member including a beam extending along and under said edge, said beam being formed with a vertical rib extending upwardly and being laterally spaced from said edge, an insulator disposed on said beam and extending upwardly adjacent to said edge and being attached along a lower portion to said rib, a cap disposed on top of said lateral edge and being attached to said insulator, and a strap extending upwardly through said cap, whereby said insulator forms a thermal break for said skylight.

* * * * *